LOUDOUN COUNTY, VIRIGINIA
SCOTT JENKINS MEMORIAL PARK
CONTRACT NO. QQ-01594

SECTION 02920

PARK EARTHWORK

SECTION 3.01 EARTHWORK

1. GENERAL

1.1 All work under this section is subject to the provisions of Chapter 1, Section 1.01
General References for All Sections.
1.2 Review all Drawings and all Sections of these Standards for provisions affecting the work of this Article.
1.3 Review all applicable drawings for environmentally sensitive areas and delineation thereof. The Contractor shall use extreme care to prohibit any unauthorized disturbance or damage within these areas.

2. SCOPE

2.1 The work covered by this Article consists of the following:
2.1.1 Preparing and grading subgrades for slabs-on-grade, walks, pavement, and landscaping.
2.1.2 Excavating and backfilling for buildings and structures.
2.1.3 Gravel and moisture-control fill course for slabs-on-grade.
2.1.4 Subbase course for walks and pavement.
2.1.5 Excavating and backfilling trenches within building lines.
2.1.6 Excavating and backfilling for underground mechanical and electrical utilities and appurtenances.

3. DEFINITIONS

3.1 Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
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3.2 removed
3.3 Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, gravel fill, or topsoil materials.
3.4 Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
3.5 Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade of a pavement walk or walk.
3.6 Base Course: The layer placed between the subbase and surface pavement in a paving system.

3.7 Gravel Fill: Course of washed granular material supporting slab-on-grade placed to cutoff upward capillary flow of pore water.

3.8 Unauthorized over excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by PRCS. Unauthorized excavations, as well as remedial work directed by PRCS, shall be at the Contractor's expense.

3.9 Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

3.10 Utilities include on-site underground pipes, conduits, ducts, and cables, as well as ground services within building lines.

4. SUBMITTALS

4.1 Submit a sample of each type of warning tape or flagging.

5. QUALITY ASSURANCE

5.1 Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

5.2 Testing and Inspection Service: Contractor will employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.

5.3 Before commencing earthwork, meet with representatives of the governing authorities, PRCS, Architect, Consultants, Geotechnical Engineer, Testing Agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least three (3) working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.

6. PROJECT CONDITIONS

6.1 Existing Utilities: Do not interrupt existing utilities serving facilities occupied by PRCS or others except when permitted in writing by PRCS and then only after acceptable temporary utility services have been provided.

6.2 Provide a minimum 48-hour notice to PRCS and receive written notice to proceed before interrupting any utility.

6.3 Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shutoff services if lines are active.

7. MATERIALS

7.1 Soil Materials

7.1.1 General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.

7.1.2 Satisfactory Soil Materials: Materials used in establishing grades within limits of buildings, paved areas, athletic fields, grass areas, etc., which have been approved for use by the Geotechnical Engineer or Testing Agency.

7.1.3 Structural Backfill Materials: Satisfactory soil materials free of rock or gravel larger than 3" in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter, and meeting the requirements of

7.1.5 and 7.1.6 for building and paved areas, respectively .
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7.1.4 Structural Fill Materials: Satisfactory soil materials free of rock or gravel larger than 6" in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter, and meeting the requirements of 7.1.5 and 7.1.6 for building and paved areas, respectively.

7.1.5 Structural Backfill and fill material within the building perimeter and extending a minimum of 20-feet beyond the building exterior walls shall be satisfactory excavated or borrow material with a liquid limit less than 40 and a plasticity index less than 20.

7.1.6 Backfill and fill material within the perimeter of paved areas and extending a minimum of ten (10) feet beyond the perimeter of paved areas shall be satisfactory excavated or borrow material with a liquid limit less than 40 and a plasticity index less than 20.

7.1.7 Backfill and fill for grass areas shall be satisfactory excavated or borrow material. Fill material shall be approved by the Geotechnical Engineer or Testing Agency prior to placement.

7.1.8 Subbase and Base Material: Naturally or artificially upgraded mixture of crushed gravel, crushed stone, or crushed slag in accordance with VDOT Specification for Type I, 21 A or 21B aggregate.

7.1.9 Bedding Material: Subbase or base materials with 100 percent passing a one (1)inch sieve and not more than eight (8) percent passing a No. 200 sieve.

7.1.10 Gravel: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D448, coarse aggregate grading size 57, with 100 percent passing a 1-1/2inch sieve and not more than five (5) percent, passing a No. 8 sieve.

7.1.11 Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 50 sieve.

7.1.12 Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

7.2 Accessories
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7.2.1 Detectable Warning Tape: Acid-and alkali-resistant polyethylene film warning tape, manufactured for marking and identifying underground utilities, six (6) inches wide and four (4) mils thick minimum, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 2'-6" deep.

7.2.2 Tape Colors: Provide tape colors to utilities as follows:

7.2.2.1 Red: Electric

7.2.2.2 Yellow: Gas, oil, steam, and dangerous materials.

7.2.2.3 Orange: Telephone and other communications.

7.2.2.4 Blue: Water systems.

7.2.2.5 Green: Sewer systems.

8. METHOD

8.1 Preparation

8.1.1 Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

8.1.2 Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

8.2 Dewatering

8.2.1 Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

8.2.2 Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

8.3 Excavation

8.3.1 Unclassified Excavation: Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.

8.4 Stability of Excavations
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8.4.1 Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

8.5 Excavation for Structures

8.5.1 Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 feet. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.

8.5.2 Excavations for Footings and Foundations: Do not disturb bottom of

excavation. Excavate by hand to final grade just before placing concrete reinforcement or place a clean concrete mud mat below the design bottom of the footing in order to protect the bearing surface. Trim bottoms to required lines and grades to leave solid base to receive other work.

8.5.3 Excavation for Underground Tanks, Basins, and Mechanical or Electrical Appurtenances: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot. Do not disturb bottom of excavations intended for bearing surface.

8.6 Excavation for Walks and Pavement

8.6.1 Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

8.7 Approval of Subgrade

8.7.1 Notify PRCS when excavations have reached required subgrade.

8.7.2 Provide PRCS with Geotechnical Engineers reports prior to sign-off on Checklist.

8.7.3 When PRCS determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed by the Geotechnical Engineer or Testing Agency.

8.7.4 Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by PRCS.

8.8 Storage of Soil Materials

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8.8.1 Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Stabilize to prevent wind-blown dust in accordance with the requirements of Virginia Erosion and Sediment Control Handbook.

8.8.1.1 Stockpile soil materials away from edge of excavations. Do not store anything within the drip line of trees to be saved.

8.9 Backfill

8.9.1 Backfill excavations promptly, but not before completing the following:

8.9.1.1 Acceptance of construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.

8.9.1.2 Surveying locations of underground utilities for record documents. Record location of utilities on as-built drawings. Place detectable warning tape over all utilities. (See paragraph 7.2 of this Section for tape specification.)

8.9.1.3 Testing, inspecting, and approval of underground utilities.

8.9.1.4 Concrete formwork removal.

8.9.1.5 Removal of trash and debris from excavation.

8.9.1.6 Removal of temporary shoring and bracing, and sheeting.

8.9.1.7 Installing permanent or temporary horizontal bracing on horizontally supported walls.

8.10 Warning Tape

8.10.1 Install warning tape directly above utilities, sleeves and conduit, 12 inches below finished grade, except six (6) inches below subgrade under pavements and slabs.

8.11 Fill unrelated to ballfields

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8.11.1 Preparation: Remove vegetation, topsoil, debris, wet and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills. Prior to fill placement, subgrade areas shall be evaluated and certified by Testing Agency to be appropriate for application. All soft or unsuitable material exposed shall be removed and replaced by the Contractor with compacted satisfactory borrow material.

8.11.1.1 Plow or break up sloped surfaces steeper than one (1) foot vertical to four (4) feet horizontal so fill material will bond with existing surface.

8.11.2 When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and re-compact to required density.

8.11.3 Place fill material in layers to required elevations for each location listed below.

8.11.3.1 Under grass, use satisfactory excavated or borrowed soil material.

8.11.3.2 Under walks and pavements, use subbase, base material, or satisfactory excavated or borrow soil material.

8.11.3.3 Under steps and ramps, use subbase material. Under building slabs, use gravel fill material.

8.11.3.4 Under footings and foundations, use satisfactory excavated or borrow soil material.

8.12 Moisture Control

8.12.1 Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 20 percent of optimum moisture content, per Sports Turf Management in Virginia Manual specifications.

8.12.1.1 Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

8.12.1.2 Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.

8.12.1.3 Stockpile or spread and dry removed wet satisfactory soil material.

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8.13 Compaction

8.13.1 Place backfill and fill materials in layers not more than eight (8) inches in loose depth for material compacted by heavy compaction equipment, and not more than four (4) inches in loose depth for material compacted by

hand-operated tampers.

8.13.2 Place backfill and fill materials evenly on all side of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.

8.13.3 Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to VTM-1.

8.13.3.1 Under structures, building slabs, steps, and pavements, compact the top 12 inches below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.

8.13.3.2 Under walkways, compact the top six (6) inches below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.

8.13.3.3 Under turf or unpaved areas, compact the top six (6) inches below subgrade and each layer of backfill or fill material at 90 percent maximum dry density.

8.13.3.4 Under athletic field areas, compact in accordance with the Atheletic Field Fill Detail (See Drawing PF-10.0 in Appendix B).

8.14 Grading

8.14.1 General: Uniformly grade areas to a smooth surface free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

8.14.1.1 Provide a smooth transition between existing adjacent grades and new grades.

8.14.1.2 Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.

8.14.2 Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
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8.14.2.1 Turf or Unpaved Areas: Plus or minus 0.10 feet.

8.14.2.2 Walks: Plus or minus 0.10 feet.

8.14.2.3 Pavements: Plus or minus 1/2 inch.

8.14.3 Grading Inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

8.15 Subbase and Base Courses

8.15.1 Under pavements and walks, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.

8.15.1.1 Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections and thickness in accordance with VDOT requirements.

8.15.1.2 Shape subbase and base to required crown elevations and cross-slope grades.

8.15.1.3 When thickness of compacted subbase or base course is six (6) inches or less, place materials in a single layer.

8.15.1.4 When thickness of compacted subbase or base course exceeds six (6) inches, place materials in equal layers, with no layer more than six (6) inches thick or less than three (3) inches thick when compacted.

8.15.2 Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders at least 12 inches wide of acceptable soil materials and compact simultaneously with each subbase and base layer.

8.16 Gravel Fill

8.16.1 Under slabs-on-grade, place gravel fill course on prepared subgrade. Compact gravel fill to required cross sections and thickness.

8.16.2 When compacted thickness of gravel fill is six (6) inches or less, place materials in a single layer.

8.16.3 When compacted thickness of gravel fill exceeds six (6) inches thick, place materials in equal layers, with no layer more than six (6) inches thick or less than three (3) inches thick when compacted.

8.17 Field Quality Control

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8.17.1 Testing Agency Services: Each lift of fill or backfill and each subgrade shall be monitored and tested by the Geotechnical Engineer or Testing Agency in accordance with this section. Do not proceed until test results for previously completed work verify compliance with requirements.

8.17.1.1 Perform field in-place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), ASTM D 2937 (drive cylinder method), or ASTM D 2922 (Nuclear Method), as applicable.

8.17.1.2 When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gauges at beginning of work.

8.17.1.3 Footing Subgrade: At footing subgrades, perform at least one test of each soil stratum to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of each subgrade with related tested strata.

8.17.1.4 Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field inplace density test for every 2,500 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

8.17.1.5 Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 50 feet or less of trench, but no fewer than two (2) tests.

8.17.2 When testing agency reports that subgrades, fills, or backfills are below

specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained.

8.18 Protection and Remediation

8.18.1 Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
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8.18.2 Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.

8.18.3 Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.

8.18.4 Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the extent possible.

8.19 Disposal of Surplus Materials

8.19.1 Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off of the property.

8.20 Refer also to Athletic Field Fill Detail PF-10.0 for additional specifications.
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